

## How protecting fruit and vegetable in organic farm in sub-Saharan Africa

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### Abstract

Under the tropics fruits and vegetables can be damaged by a lot of pest species throughout the year. Pest outbreaks depend generally of the rains and plant hosts. Healthy plants are more or less able to protect themselves against pests. For this reason, a crop properly watering or fertilized would be less damaged by pest than stressed plants. In the same way, different plant species in good rotation and in association would be less susceptible or attractive to pests than a single crop in a big plot. The major pest of fruit and vegetable are mainly the caterpillars and the worms from Lepidoptera and fly species respectively. Indeed, their larva damage directly the production eating leaves, flowers and/or fruits. Natural enemies such as birds, insect predator or parasitoids could regulate part of these pests but they have to be attracted and maintained in the field as they are negatively impacted by heavy chemical use in agriculture. Moreover, alien species such as the red spider mite *Tetranychus evansi* or the tomato leafminer *Tuta absoluta* are unknown by the local natural enemies and outbreaks can be very high, with 100% of crop losses. Conversely, indigenous vegetables more tolerant to local pest than exotic species can be highly damaged by alien species. Then, as one larva can damage one fruit, sometimes more, its impact on production can be significant for the farmer. To protect high value crops producing leaves such as cabbage or fruits such as tomato, netting technology has been showed to be very effective against worms and caterpillars. As such, the use of netting technology has generated significant interest among smallholder growers particularly organic farmers. Cost benefice analysis with net on nurseries or cabbages in Benin has been showed to be significantly higher as compared with open field and the return on investment of a nethouse in Kenya was 1.5 year with a rotation of tomato, green beans and cabbage. Depending of the crop, netting technology can be used on low or high tunnel with wood or metal frame. Ventilation can be managed with the size of mesh. Higher is the temperature and relative humidity, larger would be the mesh size. Against the small pest such as whiteflies, aphids, thrips or mites, biological control methods can be used as these piercing and sucking insect do not damaging directly the production. Sprays of black soap or plant extracts based on garlic, onion or pepper may reduce sucking pest outbreaks. Even the association of companion plants such as thyme, African marigold or lemongrass could help at a low level by repelling some pest species. Biopesticides based on *Bacillus thuringiensis* or entomopathogenic fungi can also be used alone or in association with other biological control methods like insect traps to reduce pest populations. All these biological methods have to be use all together and mainly in a preventive way.

**Key words:** vegetable, pest, biological control, netting technology